Board 135: Connection of the Teaching, Learning and Instructions of Material Science and Engineering Courses with Different Courses on Engineering Subjects

Prof. Jiliang Li, D.Eng., Ph.D., P.E., California Baptist University

Dr. Jiliang Li, D.Eng, Ph.D., P.E., M.ASCE, is an Assistant Professor of Civil Engineering and Construction Management at California Baptist University (CBU) currently teaching Surveying and 3 Labs sections, Soil Mechanics and 2 Labs sections in fall semester; Foundation Engineering, Materials Engineering and 2 Lab sections, and a Construction Law and Safety classes in spring semester. Before working at CBU, Dr. Li has been an assistant professor of civil engineering at Purdue University Northwest (PNW) two campuses since 2014. While at PNW, he had experience of teaching Surveying and GIS, engineering geology, soil mechanics I and II, intermediate soil mechanics, foundation engineering, rock mechanics, soil engineering, surface water hydrology, engineering hydrology and hydraulics, environmental engineering, fluid mechanics, statics, materials science, structure and properties of materials, etc. Before coming back to teach at Purdue University, he had industrial experience in several States with projects consulting experience ranging from small residential, commercial and subdivision projects to larger scale State DOT and federal projects after additional courses and research study of geotechnical engineering at University of Akron. Dr. Li has teaching and research interests ranging from engineering mechanics encompassing statics, dynamics, mechanics of materials and geotechnics (including geomechanics, rock mechanics, soil mechanics and engineering geology/hydrology), probability and statistics applications in civil engineering, and reliability based LRFD of geotechnical engineering, design of earth structures, soil and rock exploration, geotechnical and foundation engineering in particular. Dr. Li can be reached at JLi@Calbaptist.Edu and/or Li1919Purdue@Gmail.Com

Dr. Jinyuan Zhai, Minnesota State University, Mankato

Dr. Jinyuan Zhai joined the Mechanical Engineering faculty at MSU in August 2019. Before joining MSU, she has been teaching Mechanical Engineering courses at Purdue University Northwest. Dr. Zhai has also worked as a lecturer (assistant professor) of mechanical engineering at University of Science and Technology, Beijing. She earned a Ph.D. in mechanical engineering from The University of Akron in 2016 specializing in solid mechanics areas. Her dissertation work was on Modeling Ductile Damage of Metallic Materials. She received her B. Eng and M. Eng degrees in Engineering Machinery from Taiyuan University of Science and Technology, formerly known as Taiyuan Heavy Machinery Institute where she pursued MS studies on Reliability Design of Box Girders of Cranes Based on Probability Theory. Dr. Zhai has teaching and research interests in solid mechanics and their applications to different engineering fields and in particular mechanical and civil/structural engineering.

Connection of the Teaching, Learning and Instructions of Material Science and Engineering Courses with Different Courses on Engineering Subjects

JILIANG LI[1] and JINYUAN ZHAI[2]
[1]*Department of Civil Engineering and Construction Management, California Baptist University (CBU), Riverside, California, USA. E-mail: JLi@Calbaptist.Edu*
[2]*Departmen of Mechanical and Civil Engineering, Minnesota State University (MNSU), Mankato, Minnesota, USA. E-mail: Jinyuan.Zhai@mnsu.edu*

Abstract

Without materials, there will be no meaningful engineering. This idea should be grasped by all engineering students. Understanding of materials science and engineering (MSE) and how it interacts with other engineering fields will ultimately affect potential as competent engineer. To ensure prospective engineers' success, instructors within an engineering program should prioritize working in unison to educate students on MSE. The core MSE and non-MSE courses are discussed from first year through fourth year to illustrate how courses build on previously taught concepts. The courses discussed are MSE and related courses that provide relevant curriculums and instructing methods. It is vital for engineering students to recognize the importance of MSE, and the roles materials play in engineering. MSE education, instruction, and relation to MSE and non-MSE courses are dependent on the engineering program unison. Based on the analysis, it was concluded that the education and application of MSE courses are most effective when key MSE concepts, principles, and knowledge threads are continuously introduced, reviewed, and reintroduced for students in all levels of courses. For better outcomes, it is recommended that MSE instructors highlight materials' importance through application and explain MSE's connections via courses on different subjects whenever possible.

Keywords: MSE (Materials Science and Engineering); Engineering Connections, Subject Courses

1 Introduction

Accreditation Board for Engineering and Technology (ABET) [1] defines "Engineering is a profession in which the knowledge of mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefits of mankind." The key words, "materials and forces of nature," indicate engineering cannot be separated from materials. Unfortunately, many students and including some educators often think that engineering is just problem solving. An incomplete understanding of basic engineering, as defined by ABET, may unwittingly hinder the education and professional development of prospective engineers. Therefore, it is important to obtain a thorough, complete, and correct understanding of materials' role in the engineering profession. It is vital that prospective engineers know that without materials, there would not be any meaningful engineering. To ensure this outcome, instructors in an engineering program should prioritize working in unison to educate students on engineering subjects, such as MSE and related courses. This process began in an ENGR186 First Year Seminar for Engineers and ENGR190 Elementary Engineering Design at Purdue University Northwest (PNW), where the authors introduced the ABET engineering definition to their students.

MSE education and applications are important and especially effective if key MSE concepts, principles, and knowledge threads ([2,3] [19] [21]) are introduced and reviewed continuously

for students throughout their undergraduate degree studies, from first-year courses, for example, Elementary Engineering Design, to fourth-year courses, Senior Engineering Design I and II. The connections of MSE education and applications to courses on different subjects' instructions may also better help motivate students' learning of MSE courses in a proficient manner. MSE courses analyzed are based on California Baptist University (CBU), MNSU and PNW engineering programs' curriculums and the authors' personal learning/teaching, research, instructional experiences of four materials courses, EGR254 Materials Engineering, ME306/MSE20000 Materials Science, CE20400 Civil Engineering Materials – Laboratory, and MSE34400 Materials in Engineering (formerly CE/ME33001 Structure and Properties of Materials), and their applications to the courses on different subjects instructions.

It is fair to assume that ABET accredited engineering programs have similar curriculums. At PNW, the authors' first teaching, learning, and instructing experiences were mostly in its mechanical and civil engineering programs. It was decided to use said programs as the main template to explain MSE's teaching, learning, and instructions' connections to different engineering subjects' courses. The core MSE and non-MSE courses and the relevant course electives are mentioned from first year through fourth year to show how course curriculums build on MSE concepts throughout the program. The non- MSE courses mentioned are indicated as such, and all courses discussed are within either the civil, mechanical, and/or electrical undergraduate engineering program(s).

2 MSE Connections with Different Engineering Courses

PNW Civil, mechanical, and electrical engineering students must all complete ENGR18600 First Years Seminars for Engineers and ENGR19000 Elementary Engineering Design first year in their respective program [15, 16,17]. The rationale is that there are concepts and ideas applicable to all engineering fields. It is important that first-year students learn the fundamentals of engineering shared by all fields of engineering. This helps students find and enhance their chosen engineering programs passion and motivates them to learn and acquire other fundamental materials courses to finally take CE/ME/ECE42900 Senior Engineering Design I and CE/ME/ECE43900 Senior Engineering Design II, respectively [15-17].

The concept of basic engineering should ideally be instilled in a first-year course, ENGR18600 First Years Seminars for Engineers. An introductory course, such as ENGR18600, is usually best taught by professors who have diverse engineering education and instructing experiences. It is typically preferred by professors over certain design courses, such as ENGR19000 Elementary Engineering Design, CE/ME/EE42900 Senior Engineering Design I, and CE/ME/EE43900 Senior Engineering Design II. This preference may partly be due to design courses typically involve materials and laboratory sections that require significantly much more time, coordination, preparation, and contact hours with teaching engineering students.

ENGR19000 Elementary Engineering Design course involves designing and building a basswood bridge and is ideally taught by a bridge engineering faculty. The first two engineering materials (wood, specifically Basswood, a polymer plant product and tin metal) are introduced in this gateway course [24]. All the bridges built on the earth must be supported by the soils and rocks. Hence all bridges built must have a solid foundation [3]. To properly educate students on this concept, geomaterials, including ceramics, soils and rocks, and the skeleton framework of Unified Soil Classification System (USCS) were introduced. To pique students' interests, we introduced simple sieve analysis lab tests. This helps

expanding students' design concepts not only involving mechanical, electrical, and structural design, but also civil and geotechnical design. ENGR19000 course instructors incorporate tin melting point laboratory test demonstrations into the course's curriculum to highlight the importance of MSE. The tin melting point lab directs students to the material's phase diagrams as the melting temperature of tin and lead alloys will vary depending on the phase of the tin and lead, respectively. Almost all four categories of materials (metals, polymers, ceramics, and composites) are used or accessed by students in different forms throughout laboratory experiments [8, 9, 24]. Examples of the various experiments and materials students are exposed to include polymers, cutting metal saw, measuring tape made of plastic, wood, steel or polymer, tin and lead, water, steel sieves, and geomaterials.

A second-year course the author(s) taught is MSE20000/ME306 Materials Science. This course is a required course for mechanical engineering and is an elective for electrical engineering students. This course is typically completed prior to the core civil engineering course, CE20100 Surveying and GIS. CE20100 involves learning and using different tapes, such as steel tape, cloth tape, and fiberglass tape. This knowledge feeds into students' education in the subsequent course, CE/ME33001 Structure and Property of Materials. To teach the ME306/MSE20000 and CE/ME33001 courses effectively, feedback was gathered from students in various MSE courses. Based on the feedback and the courses' outcomes, students learn more of the materials information when there is a wide range of materials used in laboratory demonstrations, as shown in Materials Matter [6]. To best learn MSE phase diagrams, materials, moments, and concepts, we also introduced abundant helpful tutorials (MaterialMoments.org[5], [7], Materials Concepts 2012 [11]; Materials Education 2013[12]; NASA 360 [13]) to the students.

PNW civil engineering students take CE20400 Civil Engineering Materials [15] with MSE20000 recommended as an optional course. This course introduces the applications, specifications, and tests of common civil engineering materials: steel, aluminum, aggregates, Portland cement concrete, asphalt cement concrete, constituents of masonry, Fiber Reinforced Plastics (FRPs), and timber. Practical behaviors of these materials' systems are emphasized. An understanding of these behaviors is approached through examination of the materials' characteristics. This course also provides second-year students with introductory details of composites. At CBU, such a similar course is taught in an EGR254 Materials Engineering.

In second year of PNW's engineering programs, students take CE/ME27100 Basic Mechanics – Statics (MNSU and CBU equivalent course ME212/EGR241 Statics) built on the ENGR19000 Elementary Engineering Design. This course is a core course for civil and mechanical engineering students and an engineering elective for electrical engineering students [15-17]. In CE/ME27100, new engineering materials are introduced: steel, wood, brick, and biomaterials. These engineering materials are often encountered and covered in the structural analysis portion of Basic Mechanics I – Statics closely related to MSE. This course benefits students by preparing them for later applied mechanics courses studies: ME223/CE27301 Mechanics of Materials (equivalent CBU EGR242 Strength of Materials), ME417/ME46100 Machine Design I; CE/ME/ECE 42900 Senior Design I; and CE/ME/ECE43900 Senior Engineering Design II. A lab component is also required in ME223/CE27301 Mechanics of Materials Laboratory [15]. Another second-year relevant course is CE23200 Engineering Geology. Engineering Geology details a range of engineering materials, including water, soils, rocks, geo-strata different minerals.

Upon completion of the second-year courses, engineering students are expected to retain and relate their knowledge accumulated to their current three-hundred-level courses. This includes the third-year core course, EGR342/CE312 Fluid Mechanics, wherein the most widely used engineering material, water, is the study focus. CE323 Soil Engineering focuses on the geomaterial, soils. This course is often considered to be an entry level required course [15]. CE32300 Soil Engineering OR egr353 Soil Mechanics is widely known as Geotechnical Engineering I or II to alternate universities. It introduces geotechnical engineering and soil testing. Some of the main concepts learned are soil identification and classification tests, soil water systems, settlement principles, soil stresses, and shear strength testing. Another CE342 Engineering Hydrology and Hydraulics built on CE312 is a fundamental course focused on water resources engineering.

CE/ME33001 Structure and Property of Materials was assigned for the first author to teach twice. The first time of teaching took tremendous time and preparation efforts as the first author was initially trained within mining and geotechnical engineering without MSE courses background. This ultimately proved to be a great learning experience. It helped the author to connect with his major field of geotechnical engineering courses' instructions, as well as the authors' learning discovery. When the first author taught MSE20000 Materials Science and CE/ME33001 Structure and Property of Materials concurrently, students were introduced to the structures of different soil clay types (i.e., kaolinite, illite, and montmorillonite) which increased effectiveness and clarity of the course content [2][3] by connecting with soil mechanics. For example, CBU students taking EGR353 Soil Mechanics class were asked to connect their EGR254 Materials Engineering class. A scanning electron microscope can be used to capture a detailed image as shown in Fig. 1 to help pique students interests of both EGR254 Materials Engineering and EGR353 Soil Mechanics and EGR354 Soil and Foundation Engineering class.

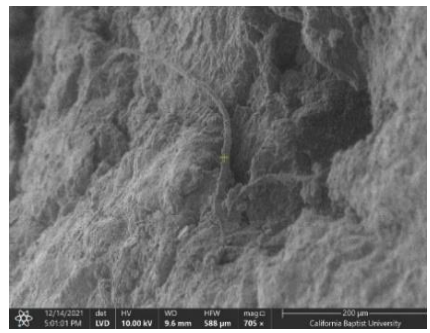

Fig. 1 Clay Scanning Electron Microscope (SEM) image with Axia ChemiSEM

To effectively teach MSE20000/ME306 Materials Science and CE/ME33001 Structure and Property of Materials, students were shown the Material Matter demonstration video [6] and Materials Concepts [11] in class. Students like to watch the demonstration video at the beginning of the semester, and again at the end of semester learning. To further assist students in understanding the materials muddy concepts, pertinent engineering education paper [7] explaining muddy concepts, as well as the corresponding videos were embedded in lecture notes. To motivate students learning materials beyond ME306/MSE20000, real world NASA projects and videos are introduced and shown in class and students are asked to watch these videos at their own pace outside of lecture. Examples of said NASA projects and videos are listed in the references [13] [14] [18]. MSE34400 Materials in Engineering introduces new areas of materials science, including but not limited to superconductors and biomaterials. It also covers a selection of materials, strengthening, and environmental effects through the completion of laboratory experiments. CE354 Introduction to Environmental Engineering includes furthermore different chemical materials, water, wastewater and pollutions studies. CE354 Foundation Engineering is also closely tied to MSE through different foundation materials.

By senior year, almost all engineering students have a strong foundation of knowledge in their specific program (civil, mechanical, or electrical engineering) to embark on CE45301 Engineering Rock Mechanics and CE48100/EGR354 Foundation Engineering [15]. CE45301 focuses on the geomaterial, rocks and minerals, and their engineering applications. Some of the concepts covered in rock mechanics include the state of stress in rock, rock dynamics, the rock mechanics model, the finite element model, fracturing, rock mechanics design and instrumentation, and the introduction to rock testing methods. CE48100/EGR354 Foundation Engineering was introduced to expand the geotechnical course selections for students. At both MNSU and CBU, due to the importance of Foundation Engineering course, it is a required core civil engineering course focusing on geotechnical design of shallow and deep foundations and reviews the geotechnical properties of soil and subsurface exploration, lateral earth pressure theories, retaining walls.

The different courses' teaching and instruction helps the instructors in mentoring, advising and guiding students' senior design projects in CE42900 and CE43900, Senior Engineering Design I and II, respectively [23] [8]. CE/ME/42900 and CE/ME/43900 are core courses every fourth-year engineering student in the civil, mechanical programs must complete ([15], [16], [17]). MSE related courses also include a multitude of subjects, ranging from geotechnical and geosynthetic engineering to soil mechanics and soil or ground improvement and pavement engineering.

Due to the complexity of soil materials' behavior and applied nature of soil mechanics, several different soil mechanics courses have been offered and taught in various universities [3, 8]. They include Elementary Soil Mechanics, Geotechnical Engineering I and II, Unsaturated Soil Mechanics, Expansive Soil Mechanics, Intermediate Soil Mechanics, and Advanced Soil Mechanics. An adequate research of soil materials and soil mechanics focused on geotechnical courses teaching is desirable. Fundamental MSE principles of "Processing, Structure, Property, and Performance" (PSPP) can be applied to Soil Improvement or Ground Improvement ([2]). In this case of PSPP application, trials of different processing methods, such as shallow and deep compaction, over excavation and replacement, deep replacement, drainage and dewatering, preloading, deep mixing and grouting, ground anchors and soil nailing, fill reinforcement, etc. are used to help improve the reinforced earth structures. Consequentially, the properties are improved to meet the project performance requirements.

3 Reflections for MSE Program Initiation Courses Offering and Optimizations

This paper is intended to be informational and constructive based on the limited research review and findings of three different universities MSE courses and programs. Based on the experience of teaching and learning pertinent MSE courses at CBU, PNW and MNSU, we can draw the conclusion that the current Materials Engineering in civil engineering program seems to be a misnomer and thus is best updated with a new course name like Civil Engineering Materials instead of Materials Engineering. Also, currently the two 50-minutes of lectures of EGR254 Materials Engineering are not up to par as other universities' lectures time wherein the MSE courses are taught with three hours lectures which ensures enough time to cover and teach all the MSE courses chapters of different engineering materials. The weekly lecture time for EGR254 Materials Engineering is recommended to increase to two 90-minutes lectures or three (3) 50-minutes lectures instead of just two 50-minutes lectures.

Currently at CBU, we offer and teach following materials science and material engineering and selection courses [25]. It seems that there may be some need of offering a fundamental

EGR200 Materials Science course like MNSU's ME306 Material Science and PNW's MSE2000 Materials Science as a prerequisite to the other eight to ten materials related courses. With the pertinent courses and materials science and materials engineering equipment available as well as the faculty from several departments teaching and research related materials engineering courses, there might also be some need and/or opportunity of developing a brand new MSE (Materials Science Engineering) BSMSE program herein at California Baptist University (CBU) [4, 20, 25].

CBU Spring Semester

EGR254AB	Materials Engineering	3 Units, Two 50-minutes lecture, Two 2-Hours Lab
ARC280A	Materials and Methods	4 Units
EGR242	Strength of Materials	3 Units
EGR462A	Biomaterials I: Fndmntl Concepts	3 Units

CBU Fall Semester

CON310A	Construction Materials & Methods"	3 Units
EGR344AB	Materials & Manufacturing Process	4 Units 1.5 Hours Lab
EGR373A	Materials Engineering and Selection	2 Units
EGR463A	Biomaterials II	3 Units

MSE is significant in any engineering programs in particular engineering processes (e.g., building and designing) [3]. Different materials exhibit unique constitutive material behavior that each has varying effects on the branches of mechanics. At CBU, MNSU and PNW, MSE and related courses have been designed not only on topics such as crystalline and non-crystalline materials, deformations, alloy types, ceramic types, composite types, etc., but also to use the information learned and apply it to materials used in real-world designs. Students who took this course were required to write term papers and deliver presentations over real-world design concepts and link the design concept to the course's teachings. Artificial Organs completed by Vavek et al (2018) [21] enriches their learning of materials science courses, provides the students with marketable skills, and integrates the use of the real-life engineering problems with curriculum. Our experience [9] finds that instructors that stress the connection of engineering materials to a range of MSE and non-MSE courses are helpful in aiding students' education and learning new courses.

4 Concluding Remarks

It is vital to recognize the importance of MSE in all engineering fields. MSE education, instruction, and relation to non-MSE course material is dependent on the integration of these aspects in the engineering program. It is conclusive that education and application of MSE courses are most effective when prerequisite fundamental MSE course offered with key MSE concepts, principles, and knowledge threads being continuously repeated, reintroduced, and reviewed for students in all levels of undergraduate engineering courses studies.

Acknowledgements

The authors thank the reviewers' constructive feedback. We appreciate the students enrolled in the authors' courses taught at CBU, MNSU and PNW for their feedback. We also thank our colleagues', faculty mentors', and administrators' support and accommodations. The findings, opinions expressed in this article does not reflect any organization's opinions and/or endorsement. It purely comes from the authors' motivation to better help teach and learn material sciences and materials engineering related courses and hopefully with some insight

based on personal observations and personal experience of trying to help students make connections of their different engineering courses learning.

References

[1] Accreditation Board for Engineering and Technology. (n.d.). Retrieved 1 15, 2021.

[2] Callister, W.D. and Rethwisch D. G. (2014), Materials Science and Engineering, An Introduction, Wiley Inc.

[3] Das, B. M and S. Khaled, (2018), Principles of Geotechnical Engineering, 9th Edition, CENGAGE Learning.

[4] Georgia Tech. (n.d.). School of Materials Science and Engineering. Retrieved January 15, 2021, from Georgia Tech: http://www.mse.gatech.edu/graduate/syllabi

[5] http://www.materialmoments.org/index.html, last accessed 30 December 2018.

[6] Iowa State University College of Engineering, (2012), "Materials Matter" <https://www.youtube.com/watch?v=YqctZa01f4g>, last accessed 30 December 2018.

[7] Krause, S. J., & Baker, D. R., & Carberry, A. R., & Koretsky, M., & Brooks, B. J., & Gilbuena, D., & Waters, C., & Ankeny, C. J. (2013), Muddiest Point Formative Feedback in Core Materials Classes with YouTube, Blackboard, Class Warm-ups and Word Clouds Paper presented at 2013 ASEE Annual Conference & Exposition, Atlanta, Georgia. https://peer.asee.org/22301

[8] Li J., & Zhai J. (2017), Teaching/Learning Soil Mechanics with Mnemonics, Intuition, Insight and Inspiration, 2017 ASEE Annual Conference & Exposition, Columbus, Ohio. https://peer.asee.org/28930

[9] Li J., J. Xu, N. Zeytinoglu and J. Zhai, (2019), "Design of a Carburizing Treatment of Steel Base Gear in the Materials Science Course", submitted to 2019 The American Society for Engineering Education (ASEE) Illinois-Indiana Section Annual Conference at University of Evansville, Indiana, March 22-23, 2019.

[10] Li, J., & Zeytinoglu, N., & Mojtahed, M., & Wooden, M. W., & Nnachi, I. I. (2018), Integration of a Highway Fill Embankment Case Study in Engineering Design Courses for Instructional Improvement, 2018 ASEE Annual Conference & Exposition, Salt Lake City, Utah. https://peer.asee.org/30692

[11] Materials Concepts (2012) "Muddiest Point - Phase Diagrams I: Eutectic Calculations and Lever Rule" https://www.youtube.com/watch?v=h5dwpTqacqc

[12] Materials Education (2012) What is Materials Science <https://www.youtube.com/watch?v=bobe-r8VCho&feature=youtu.be>, last accessed 30 December 2018.

[13] NASA 360 - Composite Materials <https://www.youtube.com/watch?v=tZhH2B-EI1I>, 30 December 2018.

[14] NASA (2019) NASA Human Exploration Rover Challenge, last accessed 30 December 2018, <https://www.nasa.gov/roverchallenge/guidebook/index.html >

[15] PNW. (2020). 2020-2021 Academic Catalog: Civil Engineering, BSCE. Retrieved January 15, 2021, from PNW: https://catalog.pnw.edu/preview_program.php?catoid=7&poid=2239&returnto=7054

[16] PNW. (2020). 2020-2021 Academic Catalog: Electrical Engineering, BSEE. Retrieved January 15, 2021, from PNW: https://catalog.pnw.edu/preview_program.php?catoid=7&poid=2241&returnto=705

[17] PNW. (2020). 2020-2021 Academic Catalog: Mechanical Engineering, BSME. Retrieved January 15, 2021, from PNW: https://catalog.pnw.edu/preview_program.php?catoid=7&poid=2198&returnto=705

[18] Real Engineering (2018) How NASA Reinvented The Wheel - Shape Memory Alloys, https://www.youtube.com/watch?v=2lv6Vs12jLc

[19] Shackelfford, James F. (2015) Introduction to Materials Science for Engineers, 8th Edition, Pearson.

[20] University of Wisconsin. (n.d.). Guide 2020-2021. Retrieved 1 15, 2021, from University of Wisconsin: https://guide.wisc.edu/courses/m_s_e/

[21] Vavrek S., Neuhold L., & Prim Z. (2018). Artificial Organs. Unpublished Paper Manuscript, Department of Mechanical and Civil Engineering, Purdue University Northwest, Westville, Indiana.

[22] Verhoeven, D. John (1975) Fundamentals of Physical Metallurgy, John Wiley and Sons, Inc.

[23] Wooden, M. W., Li, J., Laviolette, E., & Liu, Y. (2018), Board 54: Effective Stress and Upward Seepage Laboratory Demonstration Paper presented at 2018 ASEE Annual Conference & Exposition, Salt Lake City, Utah. https://peer.asee.org/30056
[24] Xu J., Li J., Zeytinoglu N. and Zhai J., (2019), “MS #1065, "Application of Computational Tools to Spaghetti-Based Truss Bridge Design”, submitted to 2019 The American Society for Engineering Education (ASEE) Illinois-Indiana Section Annual Conference at University of Evansville, Indiana, March 22-23, 2019.
[25] Personal email communications with Provost Dr. Chuck Sand’s office, February 14-15, 2024, California Baptist University.